Lab 3 – Functions and Control Structures

PHP Control Structures: http://www.php.net/manual/en/language.control-structures.php
PHP User-defined Functions: http://www.php.net/manual/en/functions.user-defined.php

Aims:

- To be able to use various control structures and develop your own functions.

Getting Started:

Create a new folder named "**lab3**" under the "C:\htdocs" folder on your computer. Save today's work in this folder.

Task 1: Using `if` and `while` statements

Step 1:

Create a file "**mathfunctions.php**" to contain a function called `factorial` that accepts a positive integer and returns its factorial value. A factorial of a non-negative integer `n`, denoted by `n!`, is the product of all positive integers less than or equal to `n`. For example,

5! = 5 x 4 x 3 x 2 x 1 = 120

```
<?php
  function factorial ($n) {    // declare the factorial function
      $result = 1;             // declare and initialise the result variable
      $factor = $n;            // declare and initialise the factor variable
      while ($factor > 1) {    // loop to multiple all factors until 1
        $result = $result * $factor;
        $factor--;             // next factor
      }                        // Note that the factor 1 is not multiplied
      return $result;
  }
?>
```

Step 2:

Create a file "**factorial.php**" that will include the file "**mathfunctions.php**" in order to access the defined functions in the file. It should also receive an input from "**factorialform.php**" from Step 3 via GET method, and check if the input is a positive integer then output its factorial value. Otherwise, it should generate an appropriate error message. Make sure to complete the highlighted portions.

```
<!DOCTYPE html>
<html>
<head>
<meta http-equiv="content-type" content="text/html; charset=utf-8" />
<meta name="description" content="Web Application Development :: Lab 1" />
<meta name="keywords" content="Web,programming" />
<title>Using if and while statements</title>
</head>
<body>
<?php
  include ("mathfunctions.php");
?>
<h1>Web Programming - Lab 3</h1>
<?php
  if (isset ($_GET["        "])) {  // check if form data exists
```

```
      $num = $_GET["_______"];        // obtain the form data
      if (                  ) {       // check if $num is a positive number
        if ($num == round ($num)) {   // check if $num is an integer
          echo "<p>", $num, "! is ", factorial ($num), ".</p>";
        } else {                      // number is not an integer
          echo "<p>Please enter an integer.</p>";
        }
      } else {                        // number is not positive
        echo "<p>Please enter a positive integer. </p>";
      }
    } else {                          // no input
      echo "<p>Please enter a positive integer.</p>";
    }
  ?>
  </body>
  </html>
```

Step 3:

Create a file "**factorialform.php**" that contains a form with a single text box that allows a user to enter a number, and submit it to "**factorial.php**". Make sure to complete the highlighted portions.

```
<!DOCTYPE html>
<html lang="en" lang="en" >
<head>
<meta http-equiv="content-type" content="text/html; charset=utf-8" />
<meta name="description" content="Web Application Development :: Lab 3" />
<meta name="keywords" content="Web,programming" />
<title>Using if and while statements</title>
</head>
<body>
<h1>Web Application Development - Lab 3</h1>
<form action =                method =            >
    ____________________________________
    ____________________________________
    ____________________________________
    ____________________________________
</form>
</body>
</html>
```

Test in the browser.

Task 2: Using `if` statement

Step 1:

Create a file "**leapyear.php**" with a script that tests if a variable value is a number, and if it is a leap year, and it will print a message stating whether the year is a *standard year* or a *leap year*.

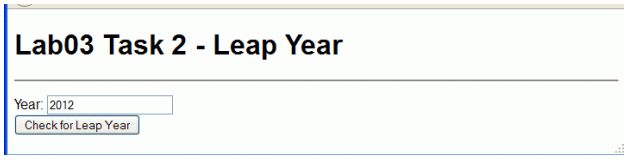
If the numerical value for a year is divisible by 4, it is a leap year. However, if the year is also divisible by 100 it is not a leap year, unless the year is also divisible by 400, in which case it is a leap year.

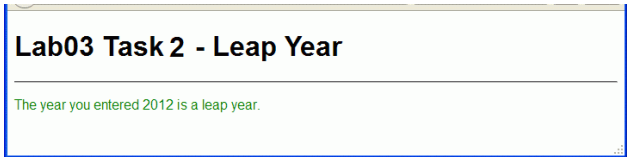
Test in the browser.

Step 2:

Create a file "**leapyearform.php**" that contains a form with a single text box that allows a user to enter a year, and submit it to "**leapyear.php**".

Change "**leapyear.php**" to receive the year entered and determine if it is a leap year.
Test in the browser, and check that the pages are valid.





Step 3:
Modify the script in "**leapyear.php**" to contain a function `is_leapyear` that accepts a single parameter representing the year. The function returns true if the year is a leap year otherwise false.

Test in the browser.

Task 3: Implementing loop statements

Step 1:
You are given an array of integers called nums, and an integer called target. Create a file "**sumPair.php**" and write the PHP codes that calculates the count of adjacent pairs whose sum equals the target.

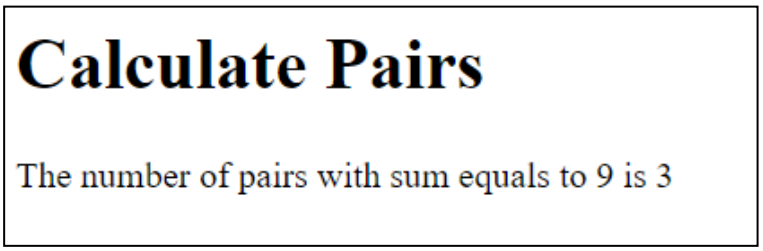
```
$nums = [2, 7, 11, 15, 3, 6, 4, 5];
$target = 9;
```

The calculation should be performed in a function as shown below.

```
function calculateSumPairs($nums, $target) {
    // Your code here

    // Return the count of pairs satisfying the condition
}
```

Display the result on the browser as shown below:



Task 4: Extra Challenge

Save a copy of "**leapyear.php**" as "**leapyear_selfcall.php**".
Copy the form from "**leapyearform.php**" into "**leapyear_selfcall.php**" and change the form action to "**leapyear_selfcall.php**" and test.

To improve the user interface, check if no form input has been entered, using the `isset` function, so that a check and display is only made when a value is submitted. http://php.net/manual/en/function.isset.php